Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, D.C.

In the Matter of	)	
	)	
The Development of Operational,	)	
Technical and Spectrum Requirements	)	
For Meeting Federal, State and Local	)	WT Docket No. 96-86
Public Safety Agency Communication	)	
Requirements Through the Year 2010	)	
	)	
Establishment of Rules and Requirements	)	
For Priority Access Service	)	

Petition for Reconsideration of Ericsson Inc. to the First Report and Order

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December 2, 1998

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Petition for Reconsideration

By Ericsson, Inc.
To the
FIRST REPORT AND ORDER
AND
THIRD NOTICE OF PROPOSED RULEMAKING

To the Commission:

INTRODUCTION

Ericsson Inc. (Ericsson) respectfully requests that the Commission revise the rules adopted in the above referenced Report and Order, as more specifically outlined herein. To meet the FCC's stated desires of developing a flexible regulatory network for promoting competition in the development of innovative public safety technologies, Ericsson respectfully requests changes in the channel plan, spectrum efficiency standards, emission limitations, automatic power control parameters and frequency stability requirements. Looking forward to embrace these emerging technologies will relieve the

limited competitive atmosphere that has existed in the public safety communications market in the past. In the eyes of the taxpaying consumers of public safety services, less expensive equipment is both reasonable and necessary.

The relatively small size of the public safety market when compared to other wireless communications markets minimizes the probability of multiple technologies being developed solely for the public safety dispatch market. One estimate of the total North America trunked, public safety market in the year 2002 is less than $2 billion dollars. Using this figure and a 7.5% average R&D investment as a percentage of sales, the total R&D investment for all of the public safety communications needs for all of the entities serving this market would be $150 million dollars per year maximum. While this is a large number, compared to the other wireless market industries that are investing over $7.5 billion dollars per year in R&D, $150 million is miniscule.

One major thrust of on-going developments in these other wireless communications markets is high-speed data services. In light of the increasing interest in and demand for high-speed data by public safety licensees, it is vitally important to understand all high-speed data developments, as well as all of the aspects of all developing technologies, to assure the technical/operational rules adopted for this new band genuinely accommodate application of these emerging technologies into this band.

The specific recommendations that follow look forward and are proposed with the intention of assuring that maximum accommodation of emerging technologies is fostered so that public safety communications needs in the future are satisfied in a cost effective, spectrum efficient manner.

BACKGROUND

L.M. Ericsson is recognized as an international leader in the telecommunications industry with 100,000 employees worldwide and business partnerships in more than 130 countries. Ericsson's presence in the United States dates back to the turn of the century. In 1989, Ericsson and General Electric formed a joint venture named Ericsson GE Mobile Communications Inc. (EGE). In 1996, the EGE name was formally changed to Ericsson Inc., Private Radio Systems Division. The Private Radio Systems Division is a part of Ericsson Inc. (USA) and is headquartered in Lynchburg, Virginia.

Ericsson has been an active participant in this Commission proceeding from its inception. In that regard, Ericsson offers the Commission its views in the following areas.

DISCUSSION

A. CHANNEL PLAN

As indicated in the previous comments we have submitted in this proceeding, Ericsson strongly supports the channel building block approach for both the narrowband and wideband portions of this new band for public safety. We strongly believe that allowing aggregation of channels on a frequency coordinated basis is essential to address multiple users needs while at the same time accommodating multiple technologies. However, upon close, specific analysis, the channel plan adopted may present several major obstacles to accommodation of newer technologies, and limit the choices public safety has to meet its needs in the future.

The first problem presented by the adopted plan concerns the aggregation of channels in the interoperability and reserved narrowband portions of the spectrum. While the discussion in the Report and Order and the rules adopted clearly indicate that up to four narrowband channels can be aggregated, this simply is impossible in the entire interoperability portion and also impossible in a significant portion of the reserved spectrum. At no place in the interoperability spectrum are more than two 6.25 kHz channels located immediately adjacent to each other. The same is also true for the majority of the reserved portion of the narrowband spectrum. The net effect is that many promising technologies could not even be considered for application in the interoperability portion of the narrowband spectrum, and many current and developing technologies would be excluded *a priori* from application in the reserved portion of the spectrum. In essence the rules may be limiting this new band to application of existing public safety technologies or to a limited number of technologies that are being developed only for specific public safety use.

The second problem that exists with the narrowband channel plan is the limitation of four on the number of channels that can be aggregated. Limiting aggregation to four 6.25 kHz channel building blocks means that the overall channel plan will not efficiently accommodate any emerging technologies that have operating bandwidths between 25 kHz and 50 kHz. Certainly the argument can be made that such systems could be accommodated in one wideband channel, but that would most likely result in less than full use of the wideband channel. Furthermore, the issue would also be what spectrum efficiency standard should be applied to systems that have operating bandwidths in the 25 to 50 kHz range. As currently written the efficiency standard for wideband channels is more than three times higher than the efficiency standard for narrowband channels.

Application of the wideband channel standard to systems with operating bandwidths between 25 and 50 kHz would likely eliminate many highly efficient technologies for voice and low speed data applications from ever being applied in this new band. Commercially developed 2nd and 3rd generation wireless technologies might be excluded because of the aggregation limit of four channels.

To alleviate this exclusion of technologies, Ericsson strongly recommends that the aggregation limit in the narrowband portion of this new band be changed to eight 6.25 kHz channels, and that the channel plan be modified to accommodate such limit in all segments of the narrowband portion of this new band. We recognize that this change may add some complication to the frequency planning and coordination process, but the benefits of maximizing flexibility, maximizing spectrum efficiency, and the removal of limitations on NCC deliberations as it commences to fulfill its mandated responsibilities, more than outweigh these additional complications.

In the wideband portion of this new band for public safety, Ericsson also supports the concept of using a building block approach. However, Ericsson believes the 50 kHz building block contained in the rules adopted is smaller than is necessary. Ericsson, therefore, recommends a more appropriate building block would be the 100 kHz building block originally proposed in this proceeding by Motorola. In its deliberation, the Commission should consider that 3rd generation wireless technologies are being specifically developed for high-speed data applications and will require, at a minimum, a 200 kHz channel.

Therefore, Ericsson strongly believes that the maximum channel size of 150 kHz in the wideband portion of this new spectrum, as a result of limiting aggregation to three 50 kHz building blocks, is too small. In lieu of the current limitations, Ericsson recommends

that an aggregation limit be established that would allow channel widths up to 600 kHz. The channel plan should also be modified to accommodate such new limits in all segments of the wideband portion of this new band.

B. SPECTRUM EFFICIENCY

As currently contained in the adopted rules, the spectrum efficiency standard for the narrowband portion of this new spectrum may be less aggressive than that which has been required for the refarmed spectrum below 512 MHz. Ericsson firmly believes that demanding less from this new, unencumbered public safety spectrum will minimize the potential benefit of this new virgin spectrum to public safety.

In the New World of digital voice transmission, a voice transmission going over the air is indistinguishable from a data transmission, in that both appear to be a stream of data bits. However, it is entirely possible, in fact probable, that a digital voice transmission even though it meets the raw data rate requirement as contained in the rules that have been adopted would only provide 1 voice path in a 12.5 kHz channel. Ericsson, therefore, strongly recommends that the specified data rate efficiency of 4.8 kbps per 6.25 kHz of bandwidth (0.77 bps/Hz) for the narrowband segment be supplemented with a requirement for voice efficiency as was done in the Refarming Report and Order for narrowband channels below 512 MHz. Ericsson recommends that a requirement similar to the following be added:

> "Transmitters designed to operate in the narrowband segment of the 700 MHz band must support a minimum data rate of 4.8 kbps per 6.25 kHz of bandwidth. Transmitters for voice communications in the narrowband segment of the 700 MHz band must also meet a spectrum efficiency standard of one voice channel per 6.25 kHz of channel bandwidth regardless of the data rate supported."

In the wideband segment of the new public safety band Ericsson believes that the required spectrum efficiency standard of 384 kbps per 150 kHz is inconsistent with high-speed data developments in other wireless communications markets. The size of the public safety market is not sufficient to expect that any number of high-speed data technologies will be developed specifically for public safety. It, therefore, is important to facilitate the application of wideband high-speed data technologies developed for other markets into this new public safety band. Rules, which inhibit the use of these new wideband high speed technologies, may result in limited or no high speed equipment being available for application in this band. Therefore, Ericsson recommends that the specified data efficiency of 384 kbps per 150 kHz wideband channel be reduced to 384 kbps per 200 kHz of bandwidth (1.92 bps/Hz) which is consistent with the high speed data equipment requirements being developed for application in other wireless communications markets at a time when this band will be available to public safety.

C. EMISSION LIMITATIONS

As indicated in our previous comments in this proceeding, Ericsson supports the coupled power concept proposed by Motorola. However, based on footnote 347 in the Report and Order and the text in para. 138 of the report and order, Ericsson is concerned the Commission has misinterpreted some of the content of our previous filings on this subject in this proceeding. In these previous filings, Ericsson provided some examples of ACCP performance for several narrowband transmitters and one wideband transmitter. The narrowband transmitters used as examples in our previous filings included a state-of-the-art linearized cellular D-AMPS (31.25 kHz) IS-136 basestation transmitter as well as a linearized 12.5 kHz TDMA transmitter currently under development. All the issues raised in our previous filings are relevant to all narrowband and wideband transmitters that might be considered for this new public safety band and are not solely applicable to transmitters which exceed the channel bandwidth limitations currently adopted. Ericsson's position on the ACCP requirement values outlined in our previous filings has been supported by a subsequent Ex Parte Filing by Nortel[1].

The challenge is to determine suitable values for the intercepted adjacent band power that will cause interference to an adjacent channel receiver and then to translate these values into corresponding ACCP requirement values. We believe further detailed analysis is required to establish appropriate intercepted adjacent band power values and to translate these values to the corresponding ACCP requirement values.

Consistent with other recommended activities for the National Coordinating Committee (NCC), Ericsson recommends that the NCC be responsible for having the

required analyses performed and for achieving industry and government consensus on appropriate ACCP requirement values. However, Ericsson feels, as a minimum, compelled to make recommended changes to the ACCP requirement values at this time even though adequate analysis has not been conducted. These recommended values are similar to the recommended changes made by Nortel.

The recommended changes to the ACCP requirement values are incorporated in the tables that follow. For measurements in adjacent 6.25 kHz bands, a measurement bandwidth of 5.0 kHz is proposed as representative of an actual receiver bandwidth. The recommended ACCP value of –25 dBc versus –40 dBc for the first adjacent 6.25 kHz band is based on the Nortel recommendation and it is also consistent with our findings discussed in previous filings. Other recommended changes include a 5 dB relaxation of the relative and absolute ACCP requirement values for some of the 6.25 kHz bands and for the first 25 kHz band in certain cases.

Earlier, we recommended that aggregation of 6.25 kHz building block channels be allowed to form channels greater than 25 kHz. Consistent with this earlier recommendation, we are also including an ACCP requirement table for a possible 31.25 kHz transmitter. Similarly, consistent with our earlier to form channels wider than 150 kHz, an ACCP requirement table for a possible 200 kHz transmitter is included.

[1] R.L. Strassburger, "Ex Parte Filing, WT Docket No. 96-86," Northern Telecom, July 10, 1998

6.25 kHz Mobile Transmitter ACCP Requirements

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP Relative (dBc)	Maximum ACCP Absolute (dBm)
6.25	5.0	-25	not specified
12.5	5.0	-55	-40
18.75	5.0	-60	-45
25	5.0	-65	-50
37.5	25	-65	-50
62.5	25	-65	-50
87.5	25	-65	-50
150	100	-65	-50
250	100	-65	-50
>400 to receive band	30 (s)	-75	-55
in the receive band	30 (s)	-100	-70

12.5 kHz Mobile Transmitter ACCP Requirements

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP Relative (dBc)	Maximum ACCP Absolute (dBm)
9.375	5.0	-25	not specified
15.625	5.0	-55	-40
21.875	5.0	-60	-45
37.5	25	-60	-45
62.5	25	-65	-50
87.5	25	-65	-50
150	100	-65	-50
250	100	-65	-50
>400 to receive band	30 (s)	-75	-55
in the receive band	30 (s)	-100	-70

25 kHz Mobile Transmitter ACCP Requirements

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP Relative (dBc)	Maximum ACCP Absolute (dBm)
15.625	5.0	-25	not specified
21.875	5.0	-55	-40
37.5	25	-60	-45
62.5	25	-65	-50
87.5	25	-65	-50
150	100	-65	-50
250	100	-65	-50
>400 to receive band	30 (s)	-75	-55
in the receive band	30 (s)	-100	-70

31.25 kHz Mobile Transmitter ACCP Requirements

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP Relative (dBc)	Maximum ACCP Absolute (dBm)
18.75	5.0	-25	not specified
25	5.0	-55	-40
40.625	25	-60	-45
65.625	25	-65	-50
90.625	25	-65	-50
150	100	-65	-50
250	100	-65	-50
>400 to receive band	30 (s)	-75	-55
in the receive band	30 (s)	-100	-70

200 kHz Mobile Transmitter ACCP Requirements

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP Relative (dBc)	Maximum ACCP Absolute (dBm)
150	80.0	-25	not specified
250	80.0	-50	-35
350	80.0	-50	-35
600 to 1000	30(s)	-60	-45
1000 to receive band	30(s)	-70	-55
In the receive band	30(s)	-100	-75

6.25 kHz Base Transmitter ACCP Requirements

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP (dBc)
6.25	5.0	-25
12.5	5.0	-55
18.75	5.0	-60
25	5.0	-65
37.5	25	-65
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
>400 to receive band	30 (s)	-80 (continues @-6dB/oct)
in the receive band	30 (s)	-100

12.5 kHz Base Transmitter ACCP Requirements

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP (dBc)
9.375	5.0	-25
15.625	5.0	-55
21.875	5.0	-60
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
>400 to receive band	30 (s)	-80 (continues @-6dB/oct)
In the receive band	30 (s)	-100

25 kHz Base Transmitter ACCP Requirements

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP (dBc)
15.625	5.0	-25
21.875	5.0	-55
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
>400 to receive band	30 (s)	-80 (continues @-6dB/oct)
in the receive band	30 (s)	-100

200 kHz Base Transmitter ACCP Requirements

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP (dBc)
150	80	-25
250	80	-50
350	80	-55
600 to 1000	30 (s)	-65
1000 to receive band	30 (s)	-75 (continues @ -6dB/oct)
in the receive band	30 (s)	-100

D. AUTOMATIC POWER CONTROL (APC)

Ericsson agrees that mobile and portable transmitter automatic power control is a communication system capability that can maintain the minimum transmitting power necessary for effective communications and can reduce the potential for interference. However, to achieve the benefits associated with APC, this feature must be implemented throughout the communications network including the radio infrastructure as well as in the mobile and portable terminal units.

The currently adopted rules for this new public safety band require mobile and portable units be designed to employ APC. However, there is no corresponding requirement to implement APC throughout the remainder of the communications network.

Providing APC capability will add cost and complexity to the mobile and portable units. Furthermore, to meet the absolute coupled power requirement of –45 dBm into the second adjacent 6.25 kHz channel for a 30 W mobile with the maximum coupled power requirement of –60 dBc, a mobile power control dynamic range of 30 dB would be required. This would require a very high performance and more expensive linearized power amplifier with accurate and complex control. The APC capability with the relatively large dynamic range will result in a more complex and higher cost mobile unit.

Ericsson believes that market and competitive forces will drive the development and implementation of APC throughout the communications network. Consequently, Ericsson believes it is inappropriate for the Commission to require APC on the mobiles and portables alone.

E. FREQUENCY STABILITY

The frequency stability required by the currently adopted rules appears to be incorrect. At 800 MHz, which is a reasonable frequency to use for illustrating the practical effects of frequency stability requirements in this new public safety band, 2.5ppm for narrowband mobiles and portables, equates to a ±2 kHz allowable frequency error. In a 6.25 kHz channel this limits the modulation spectral bandwidth to 2.25 kHz to avoid using portions of the next channel. The resultant modulation spectral bandwidth requirements of 2.25 kHz maximum might inflate the cost of equipment for this new band in an amount greater than the improved frequency stability requirements.

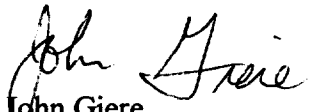
Ericsson strongly recommends that the frequency stability requirements for this new band with varying operating channel bandwidths be consistent with the frequency stability requirements for other public safety bands as established in the refarming proceeding.

CONCLUSION

Ericsson strongly believes the allocation of additional spectrum for providing critical public safety communications services is necessary. This new public safety spectrum provides an excellent opportunity for public safety to avail itself of numerous emerging technologies, which will enhance public safety's ability to satisfy critical needs in a responsible manner. Much like the defense agency's efforts to achieve cost savings while fulfilling their obligations by utilization of commercially developed technologies, this new spectrum, properly constructed, provides the same opportunity to public safety.

Ericsson strongly encourages the Commission to look forward, to capitalize on the truths of Moore's Law, and to assist public safety in seizing this opportunity by considering the recommendations outlined in the preceding discussion.

Respectfully submitted,



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